Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

For Streams with Mercury Impairment

Waterbody Segment at a Glance:

Location:	Sreams and Reservoirs Statewide **Proposed Addition to 2002 303(d) List** **40 Waterbody Segments (see List)**
Pollutant:	Mercury
Source:	Atmospheric Deposition
TMDL Priority Ranking:	To be determined

Description of the Problem

Beneficial use that is impaired

- Protection of Warm Water Aquatic Life and Human Health associated with Fish Consumption

Standards that apply

- The impairment of this lake is based on the general criterion contained in Missouri's Water Quality Standards. 10 CSR 20-7.031(3)(D), which states, "Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life."

Mercury occurs in the environment through natural processes and human activity. Naturally occurring mercury is released to the environment by volcanoes, hot springs and the weathering of rock and soil. Substantial amounts of mercury can be released to the environment from human sources. Several industrial processes such as electroplating, coal combustion for production of electricity, pulp and paper manufacturing and the formulation of pesticides use mercury. Improper disposal of such mercury-containing products as thermometers and electrical switches increases the amount of mercury released to the environment. Because it can vaporize, a large amount of mercury enters the atmosphere and is deposited globally in precipitation.

Mercury affects the human central nervous system. It is considered a neurological and developmental toxicant, and it is a possible carcinogen. Mercury can accumulate to unsafe levels in commercially and recreationally important fish. Many chemical contaminants accumulate in bottom-feeding fish. However, unlike many of these other contaminants, mercury is magnified through the food chain. Therefore, predatory fish (bass, walleye, pike and catfish) have much higher levels of mercury. Of the mercury that accumulates in predatory fish, 90 to 100 percent is in the methyl mercury form, a form that is very soluble and assimilates easily into flesh. Preparing fish by skinning and trimming does not reduce the amount of mercury because it accumulates in fish muscle tissue (fillets). Cooking or drying fish can concentrate mercury levels to even higher levels.

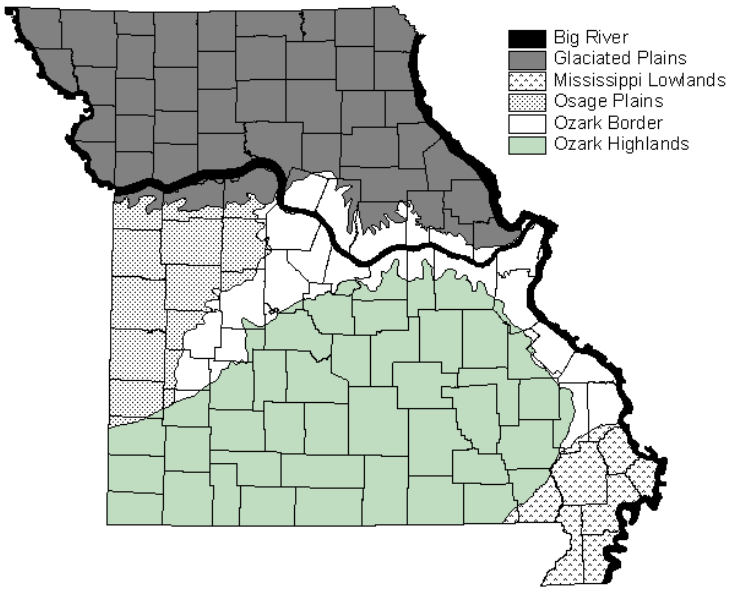
There is no clear demarcation of safe levels for mercury in fish tissue; however, mercury levels of 0.2 – 0.3 mg/kg or greater should be considered to be a general human health risk. The amount of

human health risk depends on the amount of fish eaten and the levels of mercury in the fish that are being consumed.

Based on analysis of fish fillet samples from throughout the state of Missouri, 40 specific waterbody segments have been added to the Missouri 303(d) List for mercury. Only waterbodies with data suggesting human health risk due to elevated mercury levels in fish were added to the 303(d) list; however, it is important to note that Missouri Department of Natural Resources staff believe the problem is statewide (see table and map below). In addition, the Missouri Department of Health has issued a Fish Consumption Advisory for mercury in largemouth bass throughout the state. This advisory recommends children 12 years of age or younger and women who are or may become pregnant should not eat largemouth bass over 12" in length. At least 10 other states have similar Fish Consumption Advisories. For more information on the 2001 Missouri Fish Advisory, consult the following web sites:
Missouri Department of Conservation: www.conservation.state.mo.us/news/2001/fish_consumption
Missouri Department of Health: www.health.state.mo.us/NewsReleases/01fishadvsry.html

Average Mercury Levels in Several Types of Fish in 6 Missouri Aquatic Faunal Regions

DATA THROUGH 2000	Average Mercury in mg/kg (number of samples)								
	Bass	Carp/Sucker/Buffalo	Catfish	Paddlefish	Panfish	Pike	Sturgeon	Trout	Walleye/Sauger
Big River	0.386 (5)	0.117 (96)	0.167 (40)	0.060 (1)	0.212 (4)	0.180 (2)	0.112 (14)	(0)	0.520 (1)
Glaciated Plains	0.312 (75)	0.128 (47)	0.080 (44)	(0)	(0)	(0)	(0)	(0)	0.355 (2)
Mississippi Lowlands	0.342 (10)	0.021 (3)	0.047 (3)	(0)	(0)	(0)	(0)	(0)	(0)
Osage Plains	0.333 (30)	0.037 (4)	0.111 (4)	(0)	0.240 (2)	(0)	(0)	(0)	0.132 (2)
Ozark Border	0.247 (162)	0.059 (102)	0.066 (80)	0.052 (6)	0.045 (53)	(0)	(0)	(0)	0.336 (2)
Ozarks	0.192 (196)	0.131 (226)	0.159 (72)	0.060 (132)	0.039 (34)	(0)	(0)	0.065 (2)	0.320 (10)
Statewide	0.243 (478)	0.111 (478)	0.113 (243)	0.060 (139)	0.054 (93)	0.180 (2)	0.112 (14)	0.065 (2)	0.316 (17)



Waterbodies Listed for Mercury Impairment

Ben Branch Lake—Osage County
Bethany Reservoir—Harrison County
Black River—Butler County
Bluestem Lake—Jackson County
Bourbeuse River—Franklin County
Clearwater Reservoir—Wayne County
Cooley Lake—Clay County
Crowder State Park Lake—Grundy County
Deer Ridge Community Lake—Lewis County
Ditch #1—Dunklin County
Eleven Point River—Oregon County
Fellows Lake—Greene County
Femme Osage Slough—St. Charles County
Foxboro Lake—Franklin County
Gasconade River—Gasconade County
Grand Glaize Creek—St. Louis County
Grindstone Reservoir—DeKalb County
Hough Park Lake—Cole County
Hunnewell Lake—Shelby County
Indian Hills Lake—Crawford County
James River—Stone County, two locations
Jamesport City Lake—Daviess County
Knob Noster State Park Lake—Johnson Co.
Little Blue River—Jackson County
LaBelle Lake #2—Lewis County
Lake of the Woods—Boone County
Lamine River—Cooper County
Long Branch Reservoir—Macon County
Longview Reservoir—Jackson County
Mark Twain Lake—Ralls County
Meramec River—Franklin County
Noblett Lake—Douglas County
Osage River—Osage County
Salt River—Ralls County
Schuman Park Lake—Phelps County
Smithville Reservoir—Clay County
Swift Ditch—New Madrid County
Table Rock Reservoir—Stone County
Weatherby Lake—Platte County
Winnebago Lake—Cass County

For more information call or write:

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